of which many astronomers have proved the usefulness. But comets and meteors long had great attractions for the aged astronomer. It will be remembered that he was among the first to point out a connection between the April meteors and Comet I, 1861, and to direct attention to the fact that Biela's comet would explain the appearance of the Andromeda shower.

Galle remained at Breslau in full scientific activity until 1897, when he retired to Potsdam after a long life earnestly devoted to astronomy, the interests of which he did much to forward by his zeal and energy.

## THE HON. CHARLES STEWART ROLLS.

IT is with deep sorrow that we have to record the death of the Hon. C. S. Rolls by an accident on Tuesday last, during the aviation meeting at Bournemouth. It seems that Mr. Rolls went up in his biplane for the alighting competition, and during the descent the newly fitted tail-piece of his aëroplane suddenly broke, and the whole machine collapsed and fell to the earth from a height of forty or fifty feet. Mr. Rolls was picked up unconscious and died almost immediately from concussion and laceration of the brain.

Charles Stewart Rolls was the third son of Lord and Lady Llangattock, and was born in 1877 and educated at Eton and Trinity College, Cambridge. From his early youth he was deeply interested in things mechanical, and his brief career, so sadly brought to an end, shows how successfully he utilised his mechanical capacity.

Different from many men, Charlie Rolls, as his friends called him, when he set about doing anything, always entered deeply into the subject in a thoroughly scientific manner. Whether the object on hand was connected with cycling, ballooning, motoring, or aeroplaning, in the last two of which he was a pioneer, it was always the same, and his mind was continually bent on finding out the "whys" and the "wherefores," and improving the existing state of things. The thoroughness with which he was always associated was strongly brought to my notice in the many balloon trips that I made with him, and his inquiring turn of mind was often displayed when perched up aloft in the clouds. Perhaps the best example is instanced in the quiet manner in which he spent weeks in practising gliding before finally mounting the full-sized aëroplane.

It has been said of Rolls that he was born restless, and those who knew him know how true this description was. Yet he was never flurried, but always calm and collected. It was this trait in his character that probably made him so successful in his manifold ventures.

In the death of Rolls, Britain has lost her most daring and brilliant aviator, and his friends mourn the loss of a dear comrade. WILLIAM J. S. LOCKYER.

## NOTES.

WE congratulate Sir William Crookes, F.R.S., on the new honour conferred upon him, namely, that of appointment to the Order of Merit, announced in the *London Gazette* of Friday last.

THE death is announced, at the age of forty-eight years, of Prof. Hugo Erdman, professor of inorganic chemistry in the Berlin Technical High School.

THE annual meeting of the Imperial Cancer Research Fund will be held at the Royal College of Surgeons on Wednesday, July 20, Mr. A. J. Balfour presiding.

THE *Globe* states that Herr Frick, who for many years has been engaged in exploration and scientific research, particularly in South America, where he studied the habits and customs of the Indian tribes, has been murdered by Indians in southern Bolivia.

THE death is announced in the *Athenaeum* of Prof. T. Zona, of the University of, and observatory at, Palermo; also of Prof. A. P. Sokoloff, formerly the holder of the chair of geodesy at St. Petersburg, and more recently the vice-director of the Pulkowa Observatory. Prof. Sokoloff retired from the latter position in 1905 in consequence of ill-health.

THE following officers of the Royal Society of Medicine were elected last week for the year beginning on October 1 next:—*president*, Sir Henry Morris, Bart.; *honorary treasurers*, Sir W. S. Church, Bart., and Sir F. H. Champneys, Bart.; *honorary librarians*, Mr. R. J. Godlee and Dr. Norman Moore; *honorary secretaries*, Dr. A. Latham and Mr. H. S. Pendlebury.

AT the annual business meeting of the Museums Association, held last week in York, Mr. H. M. Platnauer was elected president, and Messrs. C. H. Hunt and Deas vice-presidents. A resolution was adopted by the meeting expressing the desire that, in any revision of the grants-in-aid to provincial museums, the Board of Education would consider the advisability of continuing assistance towards the purchase of science objects.

AMONG the communications to be brought before the eighth International Physiological Congress at Vienna in September next are the following:—demonstration of method of testing colour perception spectrometer and demonstration of lantern test for colour-blindness, by Dr. Edridge-Green; the changes produced by radium in normal cells, by Dr. A. S. Grunbaum; and the summation of stimuli, by Drs. F. S. Lee and M. Morse.

THE thirty-ninth meeting of the French Association for the Advancement of Science will be held at Toulouse on August 1 to 7. The president for the year is Prof. C. M. Gariel. Among the names of the presidents of the numerous sections, we notice the following professors of the University of Toulouse:—Prof. Emile Mathias, physics; Prof. Victor Paquier, geology; Prof. M. Leclerc du Sablon, botany; and Prof. Ch. Fabre, agronomy. M. Emile Marchand, the director of the Observatory of Pic du Midi, is the president of the section of meteorology.

THE annual meeting of the British Pharmaceutical Conference will be held at Cambridge on July 26 and 27. In his presidential address, Mr. F. Ransome will deal mainly with the cultivation of medicinal plants and with medicinal plant investigation. Among the subjects of papers promised for the meeting are:—the bacteriological testing of disinfectants; an insect pest in belladonna; the proposed essential oil monographs; phosphoric acid and ammonium phosphate; the limitations of water analyses reports, both bacterial and chemical; and note on the periodicity of the properties of the elements: new arrangement.

WE have been favoured with a copy of the preliminary programme of the fifth International Congress of Photography, which is to be held in Brussels on August 1 to 6 next, from which we learn that section i. (organised by the Société française de Photographie) will deal with photo-chemistry and the scientific applications of photography; section ii. (organised by the Association belge de Photographie), the technique of photography and the industrial applications of photography; and section iii.

(organised by the Institut international de Bibliographie), photographic documents and legislation relating to documentary photography. As has already been stated in these columns, the correspondent for the United Kingdom is Mr. Chapman Jones, 11 Eaton Rise, Ealing, W.

THE death occurred at Washington, on June 26, of Prof. Cyrus Thomas, a veteran authority on the diverse subjects of ethnology and entomology. He was born in Tennessee in 1825, and from 1850 until 1865 he practised law. For the next four years he was pastor of a Lutheran Church. He was then successively an assistant on the U.S. geological surveys of the territories, professor of natural sciences at the Southern Illinois Normal University, State entomologist of Illinois, a member of the U.S. Entomological Commission, and (since 1882) a member of the staff of the U.S. Bureau of Ethnology. His earlier writings were on entomological topics, but his most numerous and best known works were concerned with the North American Indians of prehistoric times.

A LIST of the Civil List Pensions granted during the year ended March 31, 1910, has just been published as a Parliamentary Paper. Among the pensions granted in recognition of scientific work we notice the following:—Mr. Thomas Bryant, in recognition of his services towards the advancement of surgery, 100*l.*; Mrs. M. L. Gamgee, in consideration of the valuable contributions to physiological science of her husband, the late Prof. Arthur Gamgee, 70*l.*; Mrs. E. J. Seeley, in consideration of the valuable writings on geology and palæontology of her husband, the late Prof. H. G. Seeley, 70*l.*; Miss H. S. Murphy, in consideration of the services rendered by her father, the late Prof. E. W. Murphy, in furthering the use of chloroform, 50*l.*; Mr. J. Sully, in recognition of his services to psychology, in addition to his existing pension, 95*l.*; Mrs. Joanna Calder Fraser, in consideration of the value of the investigations in anatomy and embryology of her husband, the late Prof. A. Fraser, 70*l.*; Miss Julia Dobson, in recognition of the important services rendered by her brother, the late Surgeon-Major G. E. Dobson, F.R.S., to zoological science, in addition to her existing pensions, 15*l.*

PROF. T. H. CORE, formerly professor of physics in the Owens College, Manchester, died on July 9 at Withington, near Manchester, in his seventy-fourth year. When the late Balfour Stewart was appointed professor of natural philosophy in the Owens College in 1870, Mr. Core came from Edinburgh to take up the post of professor of physics, a post which he held until his retirement in 1905. Up to the appointment of a professor of applied mathematics in 1881, he took charge of the more mathematical parts of the physics teaching, but as time went on he withdrew from the more advanced work, and for several years before his retirement only lectured on experimental mechanics. He was an extremely clear lecturer, and many Owens' men who have distinguished themselves in science owe their first love of their subject to Prof. Core. He was in great demand as a popular lecturer on scientific subjects throughout the cotton towns around Manchester, and acted as examiner to many of the better schools of the district. He was of a retiring disposition, and never took a prominent part in university politics. Outside his teaching work, his principal interest lay in astronomy, and he was one of the founders, and the first president, of the Northern Astronomical Association.

IT is with regret that we learn of the death of Dr. Wilhelm Winkler, who since 1887 made valuable observations of sun-spots, double stars, comets, &c., at his private observatory at Jena. Born at Eisenberg in 1842, Dr. Winkler studied at Leipzig, and developed a practical, as well as mathematical, ability, which displayed itself in the making of watches and clocks. Then in 1875 he set up a 4½-inch Steinheil refractor at Gohlis, and made position-measures of comets, observations of occultations, &c. Later, in 1878, he commenced daily observations of the solar surface, communicating his results to Prof. R. Wolf and then to Prof. Wolfer. As ill-health prevented him from observing regularly, he directed observations made by his wife, and so kept up the continuity of the records. Removing to Jena in 1887, he employed a 6-inch refractor, fitted with clock, circles, and micrometers, for the observation of double stars. Unhappily, about two and a half years ago, a sarcoma necessitated the removal of his left eye, and this, with other serious complaints, considerably curtailed his astronomical work and caused him much suffering, which lasted until his death on June 17. Dr. Winkler's genial presence and devoted labours will, however, be sorely missed by his numerous friends and fellow workers.

WE notice with regret the announcement of the death, on July 9, of Mr. Harry W. Cox, at the age of forty-six. Mr. Cox was one of the first in this country to realise the importance to the medical profession of Röntgen's discovery, and to take up the design and manufacture of X-ray apparatus. He commenced at once to manufacture coils, interrupters, and accessory apparatus for the application of the X-rays in medical diagnosis, and to import X-ray tubes and other adjuncts to enable medical men in this country to apply the new discovery. He was always ready to work out new ideas and designs, and probably his most noteworthy achievement was to place on a practical basis the stereoscopic method of localising foreign bodies, with its corollary, the cross-thread method of localisation. The stereoscopic method also enables a picture to be obtained of the position of parts in cases of fracture and dislocation. In his investigations he exposed himself freely to the action of the X-rays, and, like so many of the pioneers in this work, he contracted X-ray dermatitis in a severe form. The disease progressed slowly but relentlessly, and he died after several years of suffering. Now that the danger of undue exposure to X-rays is understood, and efficient protective apparatus has been constructed, there is no need for an operator to take any risks, while patients run no risk whatever; for the exposures necessary for purposes of diagnosis are short, while for purposes of treatment the dose can now be accurately measured and regulated. There is thus great cause for gratitude and honour to those who, at the expense of permanent injury to themselves, have enabled their successors to work in this field in safety.

A TABLET in memory of Richard Hakluyt was unveiled in Bristol Cathedral on Thursday last. Among those present were Sir Clements Markham, K.C.B., F.R.S. (representing the Royal Geographical Society), Sir W. Lee Warner (representing the India Office), Admiral Sir Lewis Beaumont (of the Navy Records Society), Mr. W. Phillips (of the American Embassy), and Mr. A. Gray (of the Hakluyt Society). Sir Clements Markham said that Westminster Abbey, where Hakluyt was buried, or Christ Church, Oxford, where he was a student, would have formed a fitting place for that memorial, but, on the whole, Bristol had the better right. It was from that ancient port that there were sent the first voyages of discovery which occupied Hakluyt's thoughts and researches. At Bristol he was canon for more than thirty years, and there he must have conducted his researches and collected information. The most important feature in Hakluyt's character was his strenuous continuity of aim through life. He set himself to remedy two great evils of his time—the ignorance of English seamen in matters relating to the scientific branches of their profession, and the loss of records and stories of ancient voyages and travels. Besides writing and lecturing, he travelled a great deal, collecting stories and information, and set on foot work such as was now carried on by the Royal Geographical Society and other organisations. He was one of the founders of our Colonial Empire.

In distributing the prizes last week to the students of Guy's Hospital Medical School, Prof. Howard Marsh said that medicine had now become a department of biology, and it had given a powerful impetus to the study of biological science. The result had been the discovery of a new world of micro-organisms, of the existence of which nothing was known before the days of Pasteur and Lister. By far the greater number of diseases were due to the presence of micro-organisms. Who could doubt that in the next thirty years tuberculosis, which in England caused the death of 70,000 persons every year and the spoiling of the lives of probably twice that number, would be entirely swept away? Science was the acquisition of facts, and the results of research had been one of the marvels of our time. How should research be carried out? Could the man in the street tell them that? Was any man who knew nothing of biology in a position to save life? How was such a man justified in bringing charges of inhumanity and cruelty against men of science, and saying that what was being done ought to be put down by the strong hand of the law? When the public knew what advances had been made, and were told by such men as Lister and Paget that they had been gained by the only method by which they could have been achieved, who was competent to contradict them? And when it was understood that what was being done was done under Government supervision, and that no man could perform an experiment without a special licence, would not the public be satisfied that the matter was in safe hands? Would they not go further, and be grateful to those who, with unending labour, rendered such great services, and would they not extend to them their full confidence and support?

The Milan correspondent of the *Daily Chronicle* states that an Italian Royal Commission, appointed to inquire into the condition of the Leaning Tower of Pisa, has reported that the structure is in danger of collapse. The tower was begun in 1170, and took nearly a couple of centuries to complete. "Our explorations," say the members of the commission, "led to the wholly unforeseen and distressing discovery that, instead of being founded upon a massive, spacious base, as was generally believed since Grassi, in 1831, and Rohault de Fleury, in 1859, published their collections of plans, the actual foundation simply consists of ring-shaped masonry exactly corresponding in girth to the huge cylindrical mass superimposed thereon. In fact, the diameter of the inner ring foundations is 7 metres 40 centimetres, which is precisely that of the space inside the tower. This discovery, taken together with the further astonishing fact that the foundations are merely 3 metres (9 feet 9 inches) beneath the surface, constitutes henceforth incontrovertible proof that the campanile was originally built perpendicularly, and that its leaning propensities, which are becoming more and more accentuated, are due to other causes than the intention of its constructors." It is stated that the tower is farther from the vertical than it was eighty years ago. The reasons given for this difference are principally that the base of the tower has always been immersed in water, and that a deep cistern dug quite near seventy years ago with the unsuccessful object of draining a basin around the foot of the tower made matters worse. The tower was also considerably weakened by earlier excavation for a basin for mensuration purposes.

In a letter to the current issue of the *Lancet*, Dr. H. W. Thomas, of the Liverpool School of Tropical Medicine, gives an interesting account of the special screening against mosquitoes which has been effected on a freight boat of the Booth Line sailing from Liverpool to Porto Velho, a small place up the Rio Madeiro, a tributary of the Amazon. The screening of the ship is so arranged that the living quarters of the crew and officers are protected from mosquitoes. Each port-hole is provided with a movable screened frame, which is so adapted that the port-hole can be closed and screwed down without withdrawing the screen. The entrances to the main deck are protected by wire gauze spring doors, and at each side of the ash-shoot, which is of necessity open to the ingress of mosquitoes, extra sets of screened doors are placed. The doors and port-holes of the outside bridge deck cabins are also screened; the doctor's quarters and the hospital are situated further aft, and are thoroughly screened. The interior arrangements permit of no old-fashioned water reservoir over the wash-basin in the cabins, and running water is supplied everywhere. The slops from the basins run into pipes emptying directly over the side. This arrangement very satisfactorily deprives the Stegomyia larvæ of breeding places in the cabins. The ventilator pipes in the cabins and along the alleyways are each protected by a wire gauze screened frame, which slips into a grooved moulding fixed round the shaft, and is kept in place by three small buttons. The screening is composed of 18-mesh phosphor-bronze wire, a material which is more suitable for a moist, humid climate than brass or copper.

The *Journal of Hygiene* for April (vol. x., No. 1) contains a report on an investigation of "grouse disease" by Drs. Cobbett and Graham-Smith. It was found that the diseased birds generally harbour large numbers of intestinal worms, in particular a "strongylus" (*Trichostrongylus pergracilis*), which may occur in hundreds or even thousands. The conclusion is that the disease does not appear to be a specific bacterial infection, but that those birds which are more or less severely affected by strongyli suffer injury, partly by interference with nutrition, partly by the absorption of irritating or poisonous substances, which weakens them, and in bad weather may prevent them from gaining a living, and also renders them susceptible to various bacterial infections. Messrs. Hewlett, Villar and Revis also contribute a second part of their investigations on the nature of the cellular elements present in milk. Further evidence is presented showing that the cells are not leucocytes, that they may be present in enormous numbers in perfectly healthy cows, and that they are not necessarily indicative of any inflammatory condition.

In the first part of *Folk-lore* for the current year Dr. W. H. R. Rivers publishes a paper on the position of the father's sister in Oceania, particularly with reference to Banks' Island. The problem to be explained is the close connection between an individual and his father's sister in the case of people among whom the rule of matrilinear descent prevails. This relation closely resembles that of a man with his maternal uncle in patrilinear races, and it has therefore been suggested that the relation in Banks'

Island may be a survival in mother-right of a preceding condition of patrilinear descent. This theory Dr. Rivers dismisses as quite opposed to all known facts. The theory which he finally adopts is that when, for instance, a fragment of a man's umbilical cord and parings of his nails are given to the sister of his father, the intention is to entrust them to her as the representative of a group which, according to rules of descent, is necessarily foreign, and therefore hostile, in the hope that she may be able to prevent any member of that group from working black magic against her nephew. It is also possible that this strange relation indicates an increasing recognition of the kinship of the father, who deputes his sister to perform certain acts as an assertion of his paternity, thus bringing her functions into line with those which, according to one view, belong to the Couvade.

THE remains of the gigantic extinct Australian marsupial, Diprotodon, have just been re-arranged in a newly constructed wall-case in the Geological Department of the British Museum (Natural History). The restored skeleton of the animal, for which bones and plaster casts were given by the South Australian Museum, through Dr. E. C. Stirling, F.R.S., occupies the greater part of the case. It displays especially well the massive carpal and tarsal bones and the diminutive toes, which are so characteristic a feature. The limb-bones from Queensland, described by Owen, are arranged on a shelf above the skeleton, and include the first discovered femur, which was originally mistaken for that of an elephant. The skull, as described by Owen, was purchased in a restored state in a sale-room, and has now been carefully divested of all superfluous plaster, proving that the restoration erroneously increased its length by 4 inches. With the skull are several well-preserved jaws showing all the teeth. Palæontologists are still awaiting with interest the promised complete description of Diprotodon by Drs. Stirling and Zietz, of the South Australian Museum.

AMONG other additions to the exhibited collection in the Geological Department of the British Museum (Natural History) may be mentioned a new model of the skull and mandible of the gigantic extinct lemur, *Megaladapis insignis*, from Madagascar. Thanks to the explorations of Dr. H. F. Standing in the swamps, the model is no longer in any respect hypothetical. It clearly suggests an animal adapted for an aquatic life, and the characters of the known limb-bones confirm this suggestion. To the table-case near the fossil lemurs has just been added a plaster cast of the much-discussed Palæolithic human skull from Galley Hill, in Kent. The original specimen still remains in a private collection.

IN the *Entomologists' Monthly Magazine* for the current month, the Rev. F. D. Morice records a male saw-fly from Brockenhurst new to the British fauna. Provisionally the specimen is referred to *Neurotoma mandibularis*, a Continental species hitherto known only by the female. A detailed description, in Latin and English, is appended.

*British Birds* for July opens with an obituary notice, accompanied by an excellent portrait, of the late Mr. Boyd Alexander, who, it will be remembered, was murdered on April 2 by hostile natives in the heart of Africa to the north-west of Abeshr, in the Wadai. In another article Mr. W. Farren records, with illustrations, the nesting of the marsh-warbler in Cambridgeshire in June, 1909; only one previous instance, and that many years ago, is known of the species breeding in that county.

IT has been pointed out by a correspondent that in a note upon a paper by Prof. Steinmann on ammonite phylogeny (NATURE, vol. lxxxii., p. 289, January 6) the author was somewhat misrepresented. It was stated "that, in place of being a member of the 'Circumnodosi' group, Heterotissotia is really related to the Triassic Ceratites, of which it is to be regarded as the Cretaceous descendant." It should have read "that Heterotissotia is nearly related to the Triassic Ceratites, and especially the 'Circumnodosi' group, of which it is to be regarded as the Cretaceous descendant."

IN the May number of *Spolia Zeylanica* Mr. T. Southwell records the capture of a large female saw-fish (*Pristis cuspidata*) on the Ceylon pearl-banks in December last. The specimen, which measured 15 feet in length, and weighed about 17 lb., was of special interest on account of containing twenty-three intra-uterine embryos. All these embryos were in a horizontal position; but while some had their beaks close to the aperture of the cloaca, others were exactly opposite. They measured 14 inches in length, and in each the yolk-sac was united to the abdomen by a placental stalk 5 inches long. The teeth, from twenty-three to twenty-eight in number on both sides, were arranged irregularly, varying between alternation and a distribution in pairs.

IN the same issue (*Spolia Zeylanica*, vol. vi., p. 174) Mr. H. O. Barnard states, as the result of personal observation, that the alleged partiality of cobras for music is a myth. "The sole effect, so far as I could see, was to arouse their curiosity, as they would project their heads out of their holes equally well for any kind of noise, from the shrill piping affected by snake-charmers down to the tinkling noise made by dragging a chain past their dwelling, or even that made by light and repeated tappings with a switch close to their holes. It would appear, however, that the tone must be high, as grave sounds, such as tom-tom beating or deep notes from a flute, had no effect upon them." Mr. Barnard likewise confirms the observations, made in the London Zoological Gardens, as to the absence of a "fascinating" influence of serpents on birds.

IN No. 1745 of the Proceedings of the U.S. National Museum Prof. T. D. A. Cockerell discusses the bees of the genus Nomia, with the description of several new species. All the American members of the group are referred to the typical genus, although an alternative classification is mentioned, in which Nomia would be excluded from the American fauna. If this scheme were adopted, there would, however, be difficulties with regard to the non-American forms, which are not easy to classify. "The group," it is added, "is a peculiar one, and apparently its little morphological jokes must not be taken too seriously."

THE gipsy moth is so important a pest that a laboratory has been established at Melrose Highlands, Massachusetts, known as the Gipsy Moth Parasite Laboratory, where a complete study may be made of the parasites. Mr. J. C. Crawford has issued a description of several members of the families Chalcididæ, Perilampidæ, Pteromalidæ, and Eulophidæ occurring in the United States or introduced from Europe or Japan and known to be parasitic on the moth. The paper is published by the United States Department of Agriculture, Bureau of Entomology.

THE *Agricultural Journal of British East Africa* does not confine itself entirely to agriculture, but includes papers on other subjects connected with the Protectorate. Part iv. of vol. ii. contains, as special agricultural papers, accounts of the Guayule rubber industry and of Ceara rubber in German East Africa, in addition to papers on tea cultivation at Limoru. Among the more general papers is an interesting diary of a journey made by Mr. E. Battiscombe down the Tana River; photographs are reproduced showing typical views and native huts.

THE current issue of the West Indian Bulletin (No. 4, vol. x.) contains a description by Mr. Joseph Jones of some cacaos grown at the Dominica Botanic Station. The root disease of sugar-cane (*Marasmius sacchari*) is also discussed, and found to be prevalent in all districts of Antigua, although planters do not readily recognise it, and therefore cannot apply remedial treatment as early as is desirable. There is an interesting paper by Mr. G. Moody Stuart on implemental cultivation, in which attention is directed to the necessity for using the best and most efficient tillage implements, some suitable types of which are described.

THE theoretically ideal method of dealing with insect pests is to encourage their natural enemies, but it is of limited application, because complications invariably set in sooner or later. The natural enemies of the sugar-cane pests were recently described in the *Agricultural News* (No. 209). Several parasites are known of the sugar-cane borer (*Sphenophorus obscurus*), one being a Tachinid fly, one a Histerid beetle, and one a beetle of the family Elateridæ. Attempts are being made in Hawaii to introduce the natural enemies of the pests occurring there.

WE have received a little booklet, "How to Use Nitrate of Soda," with a preface by Dr. Bernard Dyer, in which summaries are given of various field trials with this fertiliser. Several old misconceptions are dealt with; it is shown that nitrate of soda is not a mere stimulant, but a true plant food, and that it does not exhaust the soil. The necessity for potassic and phosphatic manuring and for periodical liming is also emphasised. Whilst primarily intended for practical men, the pamphlet is also of interest as showing what has been done with artificial manures.

A REPORT describing the experiments made during 1909 at the Harper Adams Agricultural College, and in the counties of Staffordshire and Shropshire, has lately been issued. One of the most notable features is the cropping power of a wheat, Browick grey chaff, recently introduced to the district by the college authorities; other wheats selected from Fife are also under investigation. We have also received the report on experiments with potatoes made in 1909 by Mr. Stewart, of the Edinburgh and East of Scotland Agricultural College. The effect of a change of locality on the vigour of the plant was well marked; apparently the best change is from a later or colder district to one earlier or warmer. Thus in the south-east of Scotland it was found advantageous to procure seed from the north, just as in England it is found profitable to procure seed from Scotland or Ireland.

REFERENCE is made in the *Kew Bulletin* (No. 5) to the flowering of the Burmese rose, *Rosa gigantea*, in the Himalayan section of the temperate house, this being the first record for the gardens. Another interesting item is the production of carpophylls on a plant of *Cycas Micholitzii*, which is being cultivated in the water-lily house.

THE current number of the *Kew Bulletin* (No. 5) opens with a report, by Dr. J. M. Dalziel, on the botanical resources of Yola province, northern Nigeria. Shea kernels (*Butyrospermum Parkii*) and gum are the chief commercial vegetable products. The author was not able to trace the sources of the gum beyond recognising that it is obtained from species of Acacia and Combretum, notably *Acacia senegal* and *Combretum verticillatum*, with admixtures of inferior gum from such sources as *Anogeissus leiocarpa* and species of Albizzia. Odorous resin is obtained from two species of Boswellia—new to science—and *Daniella thurifera*. Diagnoses of new Lauraceæ from the Malayan region, by Dr. J. S. Gamble, include a dozen species of Cryptocarya and ten of the genus Beilschmiedia.

IN the first issue of the meteorological chart of the North Atlantic for July, published by the Meteorological Committee, the synchronous weather charts show that from June 9–12 inclusive an area of high barometric pressure remained nearly stationary in the neighbourhood of the Azores, and afterwards travelled slowly eastward and north-eastward, causing a gradual improvement in the weather over the British Isles. Icebergs have been sighted with increasing frequency on the Banks of Newfoundland, drifting south, but the total number is below the normal. It is stated that navigation opened earlier this year than for some years past, owing to the exceptionally favourable conditions of the ice, not only in the St. Lawrence, but also in the White Sea and the Baltic. The first steamer reached St. Petersburg on April 18, only a week later than the earliest date of arrival there on record.

THE Bulletin of the Manila Weather Bureau for November, 1909 (recently received), contains particulars of two notable typhoons which crossed the Philippine Archipelago during that month. The first, on November 6–7, was remarkable for the unusual violence which it displayed in the Visayas and the China Sea, and for the changes in direction of the track while traversing the China Sea. Attention is directed to the occurrence at two stations of ball-lightning, which is said to be extremely rare in the neighbourhood of a cyclonic vortex. The second storm, November 12–23, was distinguished by the extraordinary development which it acquired in the China Sea, and especially by the fact that for several days it remained practically stationary to the east of the Paracel Islands; from November 18 to 21 the mean velocity of translation was only about 1·5 miles per hour. The tracks of the typhoons are laid down, and isobaric charts drawn from all available observations and reports; much credit is due to the Weather Bureau for its persistent efforts to throw light on the behaviour of these destructive storms.

THE present summer has so far proved cool and unsettled, and to the present it has given cause for suspicion that the season may prove as unfavourable as that of last year. The summary just issued by the Meteorological Office for the five weeks ended July 9 shows the mean temperature for the period to be in fair agreement with the average, but there has so far been a marked absence of high day temperatures. The rainfall has been in excess of the average over the whole of England and Ireland, but there has been a slight deficiency of rain in Scotland. The greatest excess for the five weeks is 1·69 inches in the south-east of England and 1·54 inches in the Midland counties, whilst in nearly all districts the excess is more than an inch. The duration of bright sunshine is deficient in England and Ireland, but there was a slight excess in Scotland. At Greenwich, the mean conditions for June were for the most part in fair agreement with the normal, but the weather was by no means agreeable. The rain fell at the commencement and end of the month, the aggregate measurement being 2·11 inches, which is only 0·07 inch more than the average, but rain fell on sixteen days. The mean temperature was about 1° above the normal, and the duration of bright sunshine was twelve hours less than usual.

MESSRS. R. W. PAUL have issued a pamphlet entitled "The Equipment of a Modern Elementary Electrical Laboratory," in which a standardisation of instruments is advocated with the view of attaining an interchangeability of instruments, shunts, and multipliers so that any one instrument may be easily adapted for measuring a wide range of currents and voltages. The instrument recommended for the use of elementary students is the unipivot galvanometer, which has a range of 240 microamperes unshunted, and may therefore be used instead of a mirror galvanometer for many experiments. An appendix gives a list of experiments suggested for an elementary course in electrical engineering and the apparatus required for carrying them out. We think that Messrs. Paul advocate too strongly the advisability of making the carrying out of experiments easy to the student. A great part of the benefit to be derived from an experimental course lies in learning to overcome practical difficulties, and students brought up on experiments that are so carefully prepared as to eliminate such difficulties do not, as a rule, become skilful experimenters in the more advanced stages.

VOL. vii. of Contributions from the Jefferson Physical Laboratory of Harvard University contains 463 pages of reprints of fifteen papers which have appeared in the American scientific periodicals during the past year. Of these papers, we have already noticed one in these columns, that on certain thermal properties of steam, by Mr. H. N. Davis. Another of exceptional interest, by Mr. H. W. Morse, deals with the evaporation from a solid sphere. The spheres experimented on were of iodine, and had radii between 0·2 and 1 millimetre. They were supported on a thin lamina of glass attached to the end of a thin fibre of glass, the other end of which was clamped firmly in a horizontal position, *i.e.* the micro-balance of Salvioni. The evaporation took place in a large box with glass sides, through which the deflection of the micro-balance was measured by means of a microscope. The rate of evaporation proved to be proportional to the radius of the drop, and not to its surface.

AN advance copy has reached us of the catalogue of mathematical and scientific instruments to be on view at the International Exhibition at Brussels this year. This catalogue has been prepared under the auspices of the Board of Trade by the National Physical Laboratory; it refers only to the exhibits of British manufacturers. It includes detailed descriptions and illustrations of many of the instruments. A glance through this catalogue gives a very good idea of the rapid advances that are being made in the design of physical apparatus. It is invidious to select any names of exhibitors; it is enough to say that most of the leading makers of electrical, optical, surveying, navigational, and meteorological instruments are amongst them, and that the addition of historical references and lists of original publications makes the book a valuable one for reference. The price is only sixpence post free on application to the director, Exhibitions Branch, Board of Trade, Broadway, Westminster. We may add that the catalogue has been compiled free of cost to the exhibitors, and it is hoped that the prospect of the publication of a similar catalogue for the International Exhibition at Turin next year will induce other firms to avail themselves of the many facilities which the new Board of Trade department now affords to exhibitors.

WE have received from Messrs. Baird and Tatlock (London), Ltd., a copy of the gas-calculator designed by Dr. R. C. Farmer. The diagram consists of four vertical lines; the two on the left are graduated in temperatures for wet and dry gas respectively; the line on the right is graduated in pressures (mm.). A celluloid strip bearing a black ruled line is laid across the observed pressure and temperature of the gas, and the corrected volume of 1 c.c. of gas is read off directly on the middle line. The latter is also graduated to read the logarithm of the weight of 1 c.c. of nitrogen. It is claimed to give the volume with an accuracy of 1 part in 5000, and this we have found to be the case if 0·00367 be taken as the coefficient of expansion of the gas in question. The diagram is extremely rapid and convenient in use, but it should not be lost sight of that an accuracy of 1 in 5000 is not possible with the more expansible gases.

THE synthesis of camphoric acid, as announced by Komppa in 1903, is adversely criticised by M. Blanc (of the Sorbonne, Paris) and Dr. J. F. Thorpe in a recent communication to the Journal of the Chemical Society. One of the critical stages in the synthesis consists in the methylation of a diketoapocamphoric acid with the view of completing the total of ten carbon atoms present in the molecules of camphor and of camphoric acid. Using the ester of the acid, the methylation-product is a crystalline substance melting at 85° to 88°, and was supposed by Komppa to have the new methyl-group attached to carbon; it is now shown that the methyl-group is easily removed by cold caustic potash, and is undoubtedly attached to oxygen and not to carbon; the reduction of the compound to camphoric acid would therefore involve an important molecular re-arrangement, and even if it were effected could scarcely be regarded as a direct building up of the camphor molecule.

WE have received from the Thermal Syndicate, Ltd. (Wallsend-on-Tyne), its list of pure fused silica ware. The manufacture of articles from fused silica has engaged the attention of experimenters for a long time; but, owing to the high fusing point of quartz, the difficulties met with in manufacturing articles were very considerable. The Thermal Syndicate has developed a most successful process for fusing and working silica in an electric furnace. Only in 1904, a basin of 25 cubic centimetres capacity was considered an achievement; but at the present time, pipes 12 inches in diameter and 30 inches long, and vessels of 50 litres capacity, are being manufactured. The articles manufactured by the Thermal Syndicate which are placed on the market under the trade name "Vitreosil" are of very varied character. The ware is used in the manufacture of sulphuric acid, for nitre pot pipes, and for the basins for cascade concentrators, of which there are more than 600 in use in the British Isles, representing an output of about 22,000 tons of acid. It is also used to a smaller extent in the manufacture of nitric acid, and for making the pipes which carry the gases from the roasters in the manufacture of hydrochloric acid. It can be used for making condenser worms, small electrolytic tanks where the process requires the maintenance of a high temperature, and so on. The great advantage of "Vitreosil" is that it is practically unaffected by temperature changes, the coefficient of expansion being about one-seventeenth that of glass. Owing to this property, its high fusibility and its resistance to acids, quartz is now being very largely used for the manufacture of laboratory apparatus.

THE issue of the "Statesman's Year-book" for 1910 has been published by Messrs. Macmillan and Co., Ltd. This is the forty-seventh annual publication of an invaluable work of reference. The information throughout the 1500 pages has been corrected to the latest available date, and the changes made necessary by the death of King Edward VII. and the accession of King George V., as well as those arising out of the Union of South Africa, have been recorded. The proposed changes in the administration of the Belgian Congo are indicated; the sections on China and on the Anglo-Egyptian Sudan have been improved. Among matters of current interest, reference may be made to the articles on "Second Chambers" and the results of the census of production. As usual, the annual provides a number of new maps, and among them may be mentioned those showing the development of the Congo, the proposed Central Scotland and Georgian Bay Ship Canals, the United South Africa and South African railways, and South America, showing the railways. Altogether, this edition of the "Year-book" is well up to the high standard one associates with Dr. Scott Keltie's editorship. The price of the book is 10*s.* 6*d.* net.

MESSRS. REBMAN, LTD., hope to publish during the present month a new book by Dr. Bernard Hollander entitled "The Mental Symptoms of Brain Disease," with a preface by Dr. J. Morel, Belgian State Commissioner in Lunacy.

A SECOND edition of Dr. Washington's "Manual of the Chemical Analysis of Rocks" has been published by Messrs. John Wiley and Sons in New York and Messrs. Chapman and Hall, Ltd., in this country. The first edition appeared in 1904, and was reviewed in these columns on January 5, 1905 (vol. lxxi., p. 219). The present issue has been revised and somewhat enlarged.

## OUR ASTRONOMICAL COLUMN.

**HALLEY'S COMET.**—Dr. Ebell's ephemeris for Halley's comet is continued in No. 4423 of the *Astronomische Nachrichten*, and gives the positions, &c., up to September 18. On July 16 the comet will be in R.A. 10h. 59·4m., dec. −4° 2·7′, and its estimated magnitude will be 6·3, so that further observations in these latitudes are impossible. The distances from the earth and sun, on that date, will be 197 and 162 million miles respectively.

Owing to its apparent proximity to the sun, the comet could not be extensively photographed at any one observatory, but it is hoped that when the results from various observatories come to be compared, there will be a fairly continuous record which will enable the changes in the tail to be closely followed. An example of such change is afforded by the negatives secured at Johannesburg on April 21 and Kodaikanal on April 22, the latter showing, among other changes, a large contorted streamer on one side; the similarity to the tail of Morehouse's comet is thus emphasised.

A spectrum of the comet, taken at Mount Wilson, was described by Prof. Fowler, at the last meeting of the Royal Astronomical Society, as being of the usual type. Dark Fraunhoferic lines, due to reflected sunlight, are shown in the narrow strip of the spectrum due to the nucleus, and in that of the coma the bands at λλ 473, 421, and 388 are seen. Prof. Fowler suggested that the unequal intensities of the five heads in the cyanogen, 388, band were, possibly, indications of a rather low pressure condition. A comparison of this spectrum with that of Daniel's comet (1907), taken by Prof. Campbell, shows that they are practically identical.

In the *Comptes rendus* (No. 1) for July 4 Prof. Eginitis describes the appearance of the comet at Athens since its inferior conjunction. An increased activity of the nucleus ejected large masses of matter to great distances, and on May 31 an aigrette was seen, which was brighter than the nucleus itself and turned away from the sun; this was made up of straight streamers 50″ long diverging to form an angle of 60°. It was also noticed that, after the passage, the tail became much more brilliant than before, an effect which the author ascribes, in great part, to the change in the relative positions of the comet, the sun, and the observer. From this he deduces that the brilliancy of the tail is largely due to reflected sunlight, and suggests that it affords further evidence that the tail is, to an appreciable extent, made up of fine, solid particles.

Photographic and visual observations of the spectrum, made at the Madrid Observatory since the conjunction, are described by Father Iniguez. Photographs taken on June 1, 3, and 6 show the continuous spectrum and seven superposed monochromatic images of the coma. The three least refrangible of these were observed in May, and of the four new ones the two brightest are in the extreme ultra-violet, beyond the continuous spectrum. The plate taken on June 1 shows each of the three less refrangible bands doubled. Three of the four more refrangible bands are well defined, and their wave-lengths are given as 437, 425, and 391; the other is broad, extending from λ 399 to λ 407. The visual observations indicate an intrinsic change in the band recorded as λ 567 on May 27 and as λ 559 on May 30; on the former date the red edge was sharp, whereas on the latter it was diffuse, and was not the most intense part of the band. The green band at λ 512 on May 27 and λ 516 on May 30 was sharp and apparently composite, and the difference of wave-length is attributed to a relative change in the intensities of the components *inter se.* Apparently the band at λ 472 did not change. The visual and photographic observations of the tail showed various, although not pronounced, changes, which are discussed in the note; until May 6 the tail was of the first type, but from then until the passage of the comet it was of the second, reverting to type i. after the passage.

**PREVENTION OF DEW DEPOSIT UPON LENS SURFACES.**—In a paper published in No. 7, vol. lxx., of the Monthly Notices, Mr. Franklin Adams states that the Mervel Hill photography of the northern hemisphere stars could have been completed in two years instead of nearly six if some means had been devised for preventing the deposition of dew on the lens surfaces.

He then describes a method by which the difficulty has now been overcome. An air-pump, driven by a motor, delivers a current of dried air on the lens surfaces, inside the camera, and on the film of the plate, thus preventing the dew deposits. The air is dried by forcing it over pumice stone soaked in sulphuric acid and then over glass wool.

**A VARIABLE STAR AS A TIME CONSTANT.**—Having regularly observed a variable star, No. 33 in the Harvard list, in the cluster M. 5 (Libra), Prof. Barnard discusses its light-changes in No. 4409 of the *Astronomische Nachrichten.* This star was compared with a neighbouring star, which is designated $k$, and for ten years its period has apparently remained unchanged. Therefore Prof. Barnard suggests that it, and other similar variables, might prove useful for providing a check on the constancy of the earth's rotation, or any other possibly variable elements of the solar system. It rises sharply to a maximum, at which it seems to remain for only a few minutes, and then declines quickly until it is as bright as $k$; after that the decline is more leisurely. At minimum the magnitude is 14·6, and the increase is rather more than 1·2 magnitudes, the period being $0{\cdot}50147+d$. To facilitate observations of this interesting time-standard, Prof. Barnard gives an ephemeris which is useful up to the year 1918.

**RADIATION AND ABSORPTION.**—In discussing various astronomical phenomena, the observer often has to study numerous laws concerning radiation and absorption, and this frequently necessitates looking them up especially. To obviate waste of time in this direction, Prof. Humphreys brings together, in No. 4, vol. xxxi., of the *Astrophysical Journal*, the chief laws, and discusses the general formulæ by which they are expressed. Thus the equations for the Doppler, Maxwell-Bartoli, Zeeman, and other effects are explained, and the most convenient formulæ for general use are collected in an invaluable summary which should prove of great convenience.